

**Active Longitudinal Structures of the Sun
from MDI and EIT Observations**

E.E. Benevolenskaya et al.

Pulkovo Astronomical Observatory, St.Petersburg, Russia

Using data from the EIT and MDI instruments on SOHO and from Kitt Peak Observatory we have studied the non-axisymmetrical structure and dynamics of solar activity at different levels of the solar atmosphere. The data were reduced to synoptic maps of the photospheric magnetic field and coronal structures in the EUV lines: 171Å, 195Å, 284Å, and 304Å. In addition, the coronal temperature maps were obtained using the ration of the 171Å and 195Å lines. The results reveal long-living longitudinal structures in the photosphere and corona during the transition from Cycle 22 to 23 and the rising phase of Cycle 23. We have found the Hale magnetic field polarity reversal first occurred at the active longitudes. Thus, the stable longitudinal structures play an important role in the mechanism of the solar cycle. These structures are also revealed in the large-scale structure of the corona. We study the relation between the magnetic and coronal longitudinal structures, and their role in formation of coronal holes. We discuss the relations between rotation of the longitudinal structures in the photosphere and corona and compare with the rotation rate of the solar interior using helioseismic data.

This work was carried out in the collaboration with J.T. Hoeksema, A.G. Kosovichev and P.H. Scherrer of Stanford University.